REST-ROTATION GRAZING

....a management system for bunchgrass ranges

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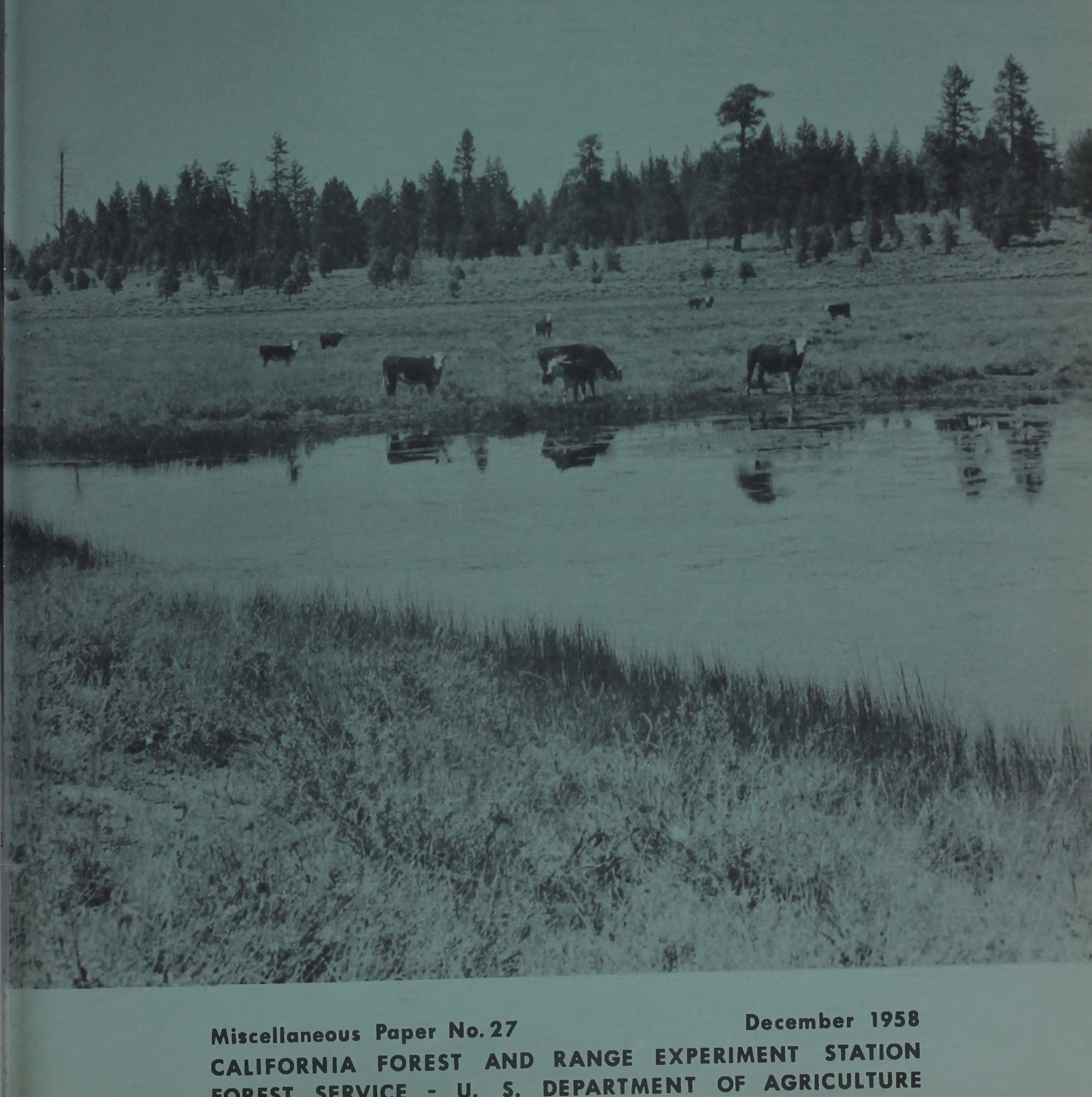

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A MANAGEMENT SYSTEM FOR BUNCHGRASS RANGES

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REST-ROTATION GRAZING - - -

A MANAGEMENT SYSTEM FOR BUNCHGRASS RANGES

Many sheepmen and cattlemen in California depend on mountain bunchgrass ranges to fill out their year-round operations. Unfortunately, many of these ranges have been so run down by past grazing that they produce only about half of the forage and livestock products they should (fig. 1). Their poor condition has also reduced wildlife, recreation, and watershed values. For a long time, range managers have needed an improved system of grazing management that would restore range productivity.

Now a system called rest-rotation grazing looks like it will do the job. This system was developed from studies carried out at the Burgess Spring Experimental Range in Lassen County, in northeastern California, from 1936 to 1951. There we learned that periodic rest from grazing is the key to improvement of bunchgrass range. A practical test of this system is now in progress on the Harvey Valley cattle allotment of the Lassen National Forest. The test will run for about 20 years. After only 7 years, there are definite indications that the grazing system is working.

Figure 1. --A deteriorated site on a mountain range. It is producing only a fraction of its former output.

Figure 2. --Many of the Idaho fescue tufts in this photo have been killed by cattle grazing. Cattle prefer areas like this and graze them closely almost every year. Such persistent close cropping kills out the better species.

WHY IS REST FROM GRAZING ESSENTIAL?

To understand why rest from grazing is needed, watch cattle grazing on bunchgrass range. They choose the plants they eat. At Burgess Spring, for example, cattle grazed certain preferred plant species on certain favored grazing areas year after year. They cropped the plants closely whether stocking of the range as a whole was light, moderate, or heavy.

The result? This continuous close cropping gradually killed the better range plants (fig. 2), and then even the less palatable species. Closely grazed plants had too little vigor to develop much seed, seed heads that did develop were stunted and could not ripen seed, and new plants that started had too little time to become established. The grazing capacity of the range decreased.

But we know that if we want to increase grazing capacity on bunchgrass ranges, we must thicken the plant cover—and this depends primarily on the establishment of reproduction of desirable species. This is where rest-rotation grazing comes in.

WHAT DO WE MEAN BY "REST"?

This system gives the range the amount of rest needed to satisfy the growth requirements of desirable range plants. At Burgess Spring we found that Idaho fescue (fig. 3)—the most important single species on the range—needed one and a half seasons of rest to recover from the shock of close cropping, regain vigor, and produce seed. All in all, we believe that this amount of rest is probably adequate to insure seed production on most bunchgrass ranges in California and on similar ranges in the other parts of the West. Another season of rest was needed to assure establishment of seedlings after germination. On more arid ranges, say those with 15 inches or less of annual precipitation, two seasons of rest from grazing at time of seedling establishment would probably be better.

Figure 3.--Characteristic aspect of an Idaho fescue stand on the margin of a valley.

HOW TO APPLY REST-ROTATION GRAZING

Take a unit of range you want to rebuild. First, rest the unit to restore plant vigor and insure seed production. When seed ripens, graze the range fully for high-level livestock production and also to get seed trampled into the soil. (If you've sown a grass crop, you know that seeds worked into the ground have a much better chance of germinating and producing well-rooted, vigorous seedlings than those that lodge on the bare soil surface.) Then rest the range to keep the young seedlings from being destroyed by grazing and trampling. Finally, graze the range fully again for high livestock production. This completes a resting-grazing cycle. The cycle should be repeated over and over again to bring on new crops of range plants continuously and to thicken the forage cover to maximum density.

1. Divide the Range into Units

To apply resting and grazing in proper sequence and at the proper time, divide the whole range into units. The number of units will depend on the growth and reproduction requirements of the key forage species on the range. For example, a minimum of four years is needed to complete a cycle of resting and grazing treatments for Idaho fescue. Therefore, the range has to be divided into four units. Five or even six treatments (and therefore units) may be required to complete the cycle for a different key species or the same species in another region. Sub-division of the range makes it possible to graze some units and rest others each year.

2. Schedule Rest and Grazing in Units

The order of resting and grazing in any one unit in a grazing system based on Idaho fescue would be as follows:

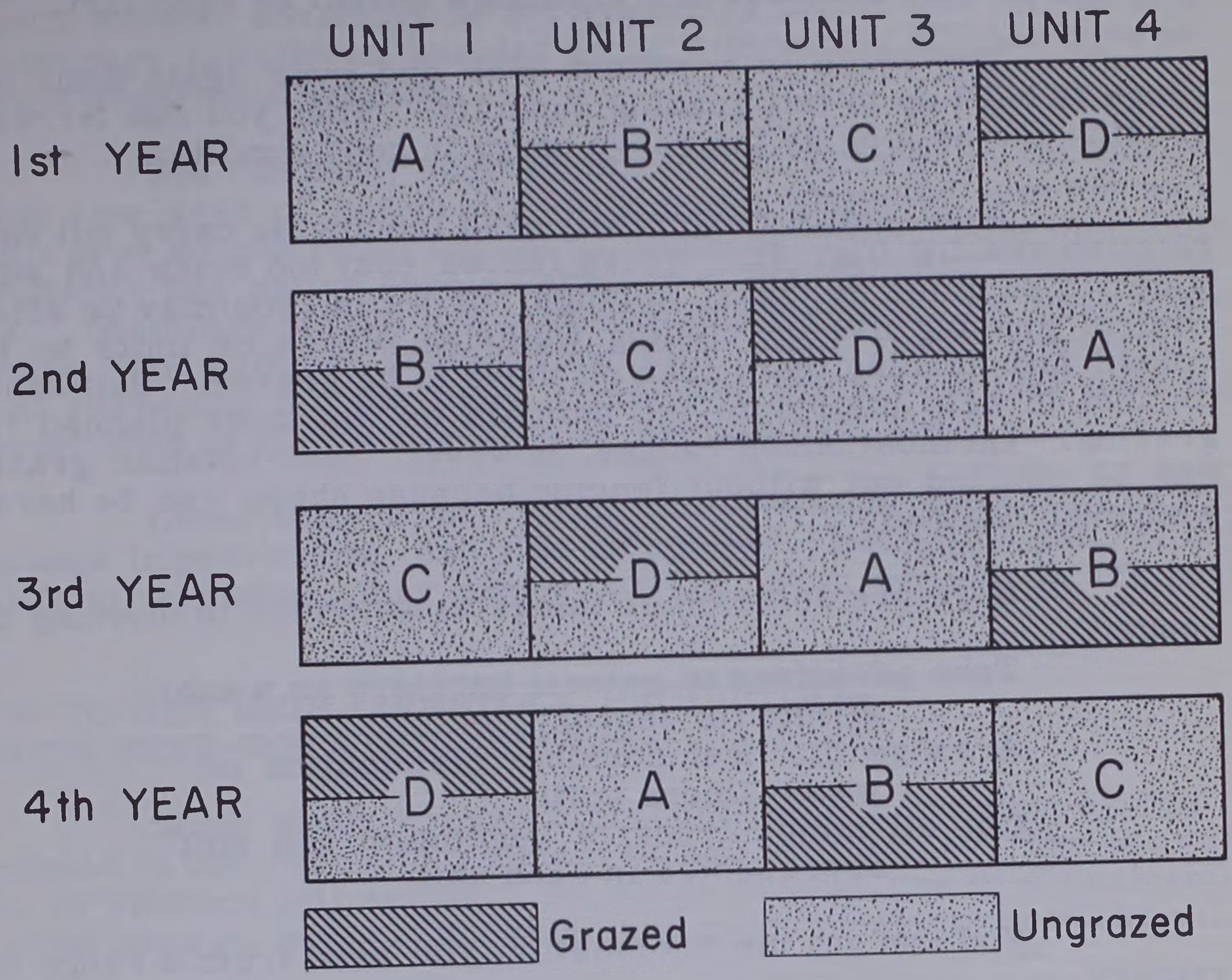
First year—Rest the entire season to restore vigor of grazed plants (treatment A).

Second year—Rest till seed ripens, then graze fully remainder of season for high livestock production (treatment B).

Third year—Rest entire season to insure establishment of seedlings (treatment C).

Fourth year—Graze fully during the first half of season or until seed ripens for high livestock production; then rest remainder of season (treatment D).

In any given year, the four units would be rested and grazed as follows:



At the beginning of the season, all the animals normally grazed on the range during a given year would be placed in the unit receiving treatment D. Then, at seed ripening time, the animals would be moved from this unit to the unit receiving treatment B. In this way, the desired grazing pressure and timing of resting and grazing are obtained in the various units.

Can you schedule enough rest without cutting the number of animals on the range? Yes, provided the range is not overstocked. The range usually is not overstocked if no more than a third of the total available herbage on the entire range is grazed by the end of the grazing season. In the rest-rotation schedule, the entire herbage crop of two seasons out of four is returned to the range to improve soil fertility and prevent erosion. Furthermore, the resulting accumulation of plant litter on the soil surface greatly increases the chances of getting seedlings established.

Another advantage of this schedule: it sets aside forage reserves that can be used when production is below average. In drought years, for example, units scheduled to be rested may be opened to grazing to carry livestock through the season. Naturally, the unit rested to protect new seedlings should be used last.

The cycle is repeated over and over again until the range is built up to full grazing capacity. Then you can increase grazing use as long as the range stays in good condition.

Most cattle ranges will need fencing to carry out rest-rotation grazing (fig. 4). Where fences cost too much and stock water is supplied by tanks, springs, or wells, you may be able to control grazing use by closing watering places on units to be rested and keeping them open on those to be grazed. Salt can be located to help distribute the animals on the units planned for grazing. On most sheep ranges, however, rest-rotation grazing can be carried out without fencing because sheep can be herded wherever desired.

Here are some other things to watch for in dividing the range:

Take advantage of natural barriers as a substitute for fences.
Arrange the best possible distribution of water among units.
Get all major types of vegetation and soil represented in each unit.

You can get the information you need from a range inventory.

Figure 4.--Fences are essential on many cattle ranges to protect certain areas from grazing at the proper time.

3. Reseed Where Natural Reproduction Is Slow

Rest-rotation grazing is designed to increase grazing capacity through establishment of new seedlings of forage plants. So still another advantage of the system is that it will let you sow and manage introduced species along with native species with no extra management expense.

You can plant seed of introduced species in the unit in which ripe seed of native plants is being trampled into the soil. You'll need no additional fences or management controls when both introduced and native species are, in effect, planted at the same time. Seedlings of both are protected from grazing the year after seeding, and both are managed together. You should plan artificial reseeding for the more productive sites wherever natural regeneration is slow under grazing management alone.

Other cultural practices, like chemical weed control and drainage improvement, can also be applied. But unlike natural and artificial reseeding, they can be carried out in any unit in any year.

HOW TO GET HIGH LIVESTOCK PRODUCTION UNDER REST-ROTATION GRAZING.

What about livestock production in a grazing system designed to increase and maintain forage production? The answer lies in efficient utilization of the range through use of a desirable grazing season, proper stocking, and good livestock distribution.

1. Select Most Suitable Grazing Season

First, use the range when grazing value is high. Nutritive value is highest when the vegetation is green and growing rapidly; it decreases as the vegetation matures and dries. Weight gains of cattle reach high rates at about the time the flower stalks of grasses start emerging from the leaf sheaths (the boot), and good gains usually continue until a month or six weeks after seed ripening. Thereafter, the rate of gain is relatively low; and after the vegetation dries, cattle may actually lose weight. The upshot of this relationship is that plant growth stages, rather than calendar dates, are the best guide to selection of a suitable season for high livestock production. However, the season that best fits a given situation is often determined not only by the livestock production potentialities of the season, but by such other considerations as when the range can be used to best advantage in relation to the whole ranching operation.

The range manager has the choice of many different seasons within the limits of the longest period of time that grazing is practical. In northeastern California some summer ranges can be grazed for as long as five months—for example, from May 15 to October 15—or for shorter periods. Stocking rate, weight gains of the individual animals, and livestock production per acre differ for the different seasons. The production that could be expected from five different length grazing seasons in the vicinity of the Burgess Spring range is shown in table 1. This table provides a still more specific guide for the selection of a grazing season for bunchgrass type range, especially when the beginning and ending of the grazing season is judged in terms of plant growth stages rather than calendar dates (fig. 5).

Figure 5. --Growth stage of Idaho fescue (upper right) marking the beginning of the optimum 4-month grazing season. The large grass tuft in the middle left is squirreltail (Sitanion hystrix).

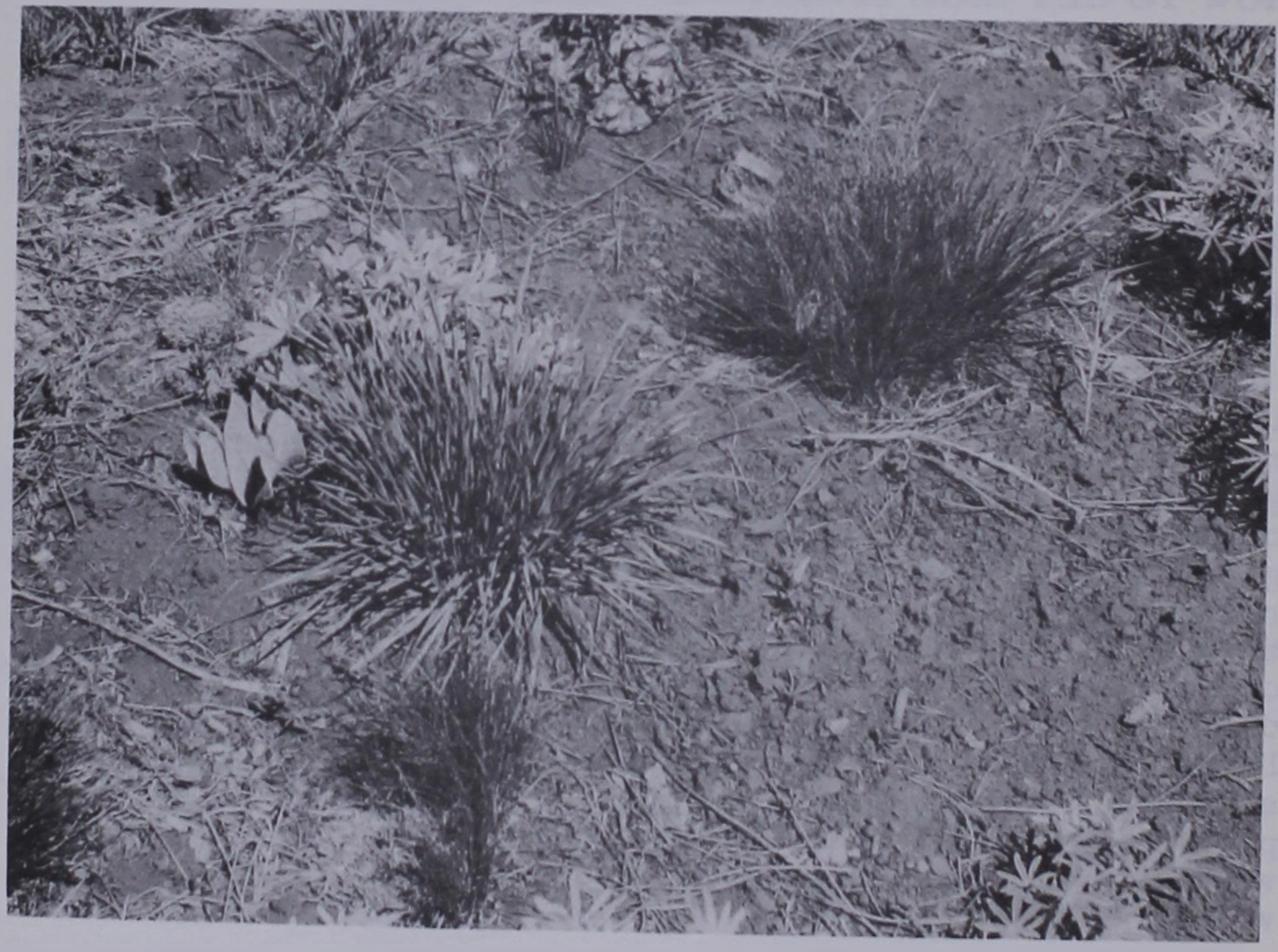


Table 1. —Estimated cattle[1/] production from five different length grazing seasons in a rest-rotation grazing system

Length of season	Beginning and ending dates	Growth stages of Idaho fescue at beginning of season	Stocking per section	Seasonal weight gain per head	Weight gain per head per day	Weight production per acre
Months	Dates		Animal units	Pounds	Pounds	Pounds
1	June 21-July 20	Flower stalks two-thirds grown	246	71	2.37	27.3
2	June 11-Aug. 9	Flower stalks one-third grown	123	130	2.17	25.0
3	May 22-Aug. 19	Flower stalks in mid-boot	76	182	2.02	21.6
4	May 22-Sept. 18	Flower stalks in mid-boot	58	212	1.77	19.2
5	May 2-Sept. 28	Basal leaves 3 inches tall	42	234	1.56	15.4

1/ Yearling heifers averaging 420 pounds.

2. Fit Stocking to Grazing Season

Second, stock the range to get full use of the total available herbage in grazed units during the grazing season. What is "full" use? In northeastern California a reasonable upper limit of use of bunchgrass ranges appears to be 66 percent. In rest-rotation grazing, comparatively full grazing can be tolerated because it is not sustained for any long period of time but is interrupted by rest periods. Start with a range survey or other estimate of grazing capacity and calculate stocking rate to get 66 percent utilization at the end of the grazing season. Later, when you have observed range and livestock responses, adjust stocking upward or downward for better results.

3. Strive for Good Distribution of Livestock

Third, promote efficient range utilization through good livestock distribution. Each range will have its own problems, so it is not possible to indicate specific measures to use; but fencing, water development, salting, and riding are common tools. Rest-rotation grazing lessens livestock distribution problems because grazing is restricted to only part of the range during a given period. Where the range units are small, distribution problems may be inconsequential.

HOW TO JUDGE THE EFFECTIVENESS OF REST-ROTATION GRAZING

Rest-rotation grazing is yielding desired results if:

...it is increasing range herbage and grazing capacity.
...it is producing acceptable livestock weight gains and production.

How do you judge? First, look for reproduction of good range species (fig. 6). This is the most important single indication that the management system is increasing grazing capacity. Establishment of reproduction reflects recovery of vigor of old plants, improvement of soil, and an upward trend in the condition of the range. If numerous 2- and 3-year-old and larger seedlings can be found in the spaces between older plants, and the range generally is improving, adequate and properly timed rest is being provided and stocking is not too heavy.

Conversely, absence of seedlings indicates that the range is static or deteriorating and that either insufficient or improperly timed rest is being provided or stocking is too heavy.

The place to look for seedlings is on areas that are usually closely grazed and are only in fair to good condition. These sites reflect the effects of grazing management more sensitively than sites in poorer or better condition. Seedlings have little opportunity of becoming established on sites in poor condition because soil conditions are unfavorable and on sites in excellent condition because there is little or no room for additional plants. To keep track of quantitative changes in grazing capacity over time, measure herbage yield on marked areas.

Secondly, collect information on weight gains and condition of the animals. Reliable information on livestock production can be obtained only by weighing the animals. Where possible, install livestock scales on the range and weigh the animals at the start and end of the grazing season.

Figure 6.--Here numerous seedlings of Western needlegrass (Stipa occidentalis) are germinating around a parent plant. Establishment of reproduction is the principal criterion that can be used to judge the effectiveness of a rest-rotation grazing system.

REST-ROTATION GRAZING IN PRACTICE

The best way to learn about rest-rotation grazing is to see for yourself. This system is getting a practical trial on the Harvey Valley range allotment of the Lassen National Forest. Typical of northeastern California summer range, the 32,000-acre allotment includes 500 acres of dry grassland, 1,300 acres of meadow, 4,100 acres of sagebrush, and nearly 15,000 acres of timber type. The rest is not suitable for grazing. The allotment has grazing capacity for 500 animal units for a 4-month season at present. Under rest-rotation grazing and supplementary range practices, the capacity is expected to be doubled in 20 years.

Construction of fences, water developments, and other grazing management facilities was started in 1951, and by 1954 the range was under management. By 1958 each of the units on the allotment had been carried through one cycle of grazing treatments. Some natural reproduction has become established in each. Good stands of smooth bromegrass, crested wheatgrass, and intermediate wheatgrass were established by reseeding and are being maintained under the system. Native grass stands were thickened and maintained on areas sprayed with 2,4-D to kill out sagebrush. The allotment speaks for itself: the trend in range condition is definitely upward and grazing capacity is being increased.